PATENT AND TRADEMARK OFFICE
PATENT APPLICATION

COLOR CODED CANDLE WICKS AND METHODS OF MANUFACTURING SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to the manufacture of candle wicks. More particularly, the invention relates to methods for manufacturing candle wicks whereby the characteristics of the wick may be readily and accurately determined.

2. Brief Description of the Prior Art

While the manufacture of candle wicks may seem to the unacquainted a simple low technology art, it is actually quite complex. Candle wick technology has evolved as has the chemical composition of candles. Different types of candles require different types of wicks and some wicks perform better than others in a given candle chemistry.

Wicks can be organized into various broad groupings based upon how they are manufactured, e.g., twisted, braided, knitted, cored, etc. and how they are shaped, e.g., flat, round, rectangular, square, etc. The twisted wicks usually are the least expensive and the lowest in quality. The flat wicks produce a strong and uniform

flame, which generally minimizes the generation of soot. The round wicks are made with copper, fiberglass, cotton, paper, etc. cores. The small sized wick provides a small flame, a slow, lasting burning and a low consumption of paraffin. A large diameter wick produces a larger wax pool with high heating. Metal cored wicks generally have average flame heights and burn with lower flame temperatures. The metal wire makes handling and manufacturing easier due to its superior rigidity. The cotton core wick has features similar to the other metal cored wicks, but are generally more sensitive to the quality of the candle wax composition. They exhibit a higher flame with a higher heating power. The paper cored wick produces an above average flame with a heating power between cotton cored and metal cored wicks. Because paper cored wicks are structurally more rigid, they make handling easier than cotton cored wicks. All of the wicks are available in different thicknesses and may be coated with, e.g., vegetable or paraffin waxes or left uncoated.

Wicks are also made of braided plies of cotton yarns. Some use hemp or wool. Anything fibrous can be used to make a wick. More plies of yarn in the braid means a bigger wick, having a higher burn rate with a wider melt pool. In addition to the paper, cotton and copper cores mentioned above, hemp and zinc cores are sometimes used.

The flat braided wicks, also known as "plaited" wicks tend to curl to one side resulting in the tip of the wick lying in the hottest part of the flame. These wicks work

well in pillar and taper candles as well as in gel candles. Candles in glass containers generally work better with a cored wick, preferably a metal core such as copper or zinc. The metal core helps keep the wick upright in a deep melt pool.

In addition to the type of wick, thickness matters as well. All of these characteristics need to be taken into account with respect to the type of candle (e.g. taper, pillar, votive, etc.) as well as the type of wax, dye, and fragrance which make up the candle. Indeed, over one thousand different types of candle wicks are available in the marketplace today.

Exemplary machinery for manufacturing candle wicks are the "Maypole Braider" series from the Wardwell Braiding Machine Company, Central Falls, RI.

Modern candle wicks are categorized according to type and thickness as well as according to rate of combustion, flame height, and pool diameter. Thickness is generally expressed as yards per pound and the rate of combustion is generally expressed as ounces per hour. In addition, wicks may be categorized according to the braiding characteristics, picks per inch, warp threads, core diameter, etc.

In commercial production, candle wicks are sold on a spool containing hundreds of yards of wick material. The wick itself is usually white with no markings on it. The characteristics of the wick are printed on a label affixed to the spool. Unfortunately,

it is possible that a spool of candle wick material is mislabeled. This can have disastrous results. If the wrong wick is used in a candle, it can create not merely an aesthetic issue but a safety issue as well. The wrong wick can cause a candle to become a dangerous article of combustion which results in dangerous, sometimes fatal, fires.

Because of the many thousands of different wick types and the many different manufacturers, it is impossible to identify a wick accurately by visual examination, even with the aid of a magnifying device. One must rely on the label.

Attempts have been made to identify wicks by, e.g., printing information on paraffin coated wicks. Wicks have also been striped (like a barber's pole). However, these wicks are considered to be visually and aesthetically unacceptable.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a visual indication in a candle wick which identifies its properties.

It is also an object of the invention to provide a visual indication in a candle wick which identifies its properties and which is not prone to error.

It is another object of the invention to provide methods for including a visual indication in a candle wick which identifies its properties.

It is yet another object of the invention to provide candle wicks having visual indications which identify their properties.

It is still another object of the invention to provide these visual indications in an aesthetically acceptable manner.

In accord with these objects which will be discussed in detail below, the methods according to the invention include inserting a colored yarn or thread into the candle wick during manufacture. The colored portion of the wick is inserted in such a way that the color is not visible on the surface of the wick and can only be seen in a cross section of the wick. According to a presently preferred embodiment, multiple color combinations are used to identify a broad range of different types of wicks. According to an optional method of the invention, the color coding of the wick also identifies the manufacturer as well as the wick characteristics.

The candle wicks according to the invention are coded at the time of manufacture and therefore maintain the proper coding throughout their chain of custody from the manufacturer to the consumer. The wick identification can be read at any time, even after the candle is consumed. Thus, fire investigations are assisted

and product liability evidence is preserved in the case of improperly manufactured candles.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of a cored round wick according to the invention during the manufacturing process;

FIG. 2 is a schematic cross section of the wick of FIG. 1;

FIG. 3 is a view similar to FIG. 2 but illustrating a multicolor coding;

FIG. 4 is a schematic view of a coreless flat wick according to the invention during the manufacturing process;

FIG. 5 is a schematic cross section of the wick of FIG. 4;

FIG. 6 is a view similar to FIG. 5 but illustrating a multicolor coding;

FIG. 7 is a schematic view of a knitted wick according to the invention during the manufacturing process;

FIG. 8 is a schematic cross section of the wick of FIG. 7;

FIG. 9 is a view similar to FIG. 8 but illustrating a multicolor coding;

FIG. 10 is a schematic view of a square braided wick according to the invention during the manufacturing process;

FIG. 11 is a schematic cross section of the wick of FIG. 10;

FIG. 12 is a view similar to FIG. 11 but illustrating a multicolor coding; and

FIG. 13 is a table illustrating an exemplary relationship between color code and wick type.

DETAILED DESCRIPTION

Turning now to FIGS. 1 and 2, a first embodiment of a candle wick 10 according to the invention includes a round braided outer part 12 which is made from cotton threads 14 in a braiding machine. The wick 10 is provided with a core 16 within which are placed a core filament 18 (e.g. cotton, paper, copper, zinc, tin, fiberglass, etc.) and a colored identification filament 20. The colored identification filament is preferably made of a compatible candle wick fiber which is dyed with a colorfast dye which will not fade or change color during combustion or over time. Although FIGS. 1 and 2 show a single monochromatic identification filament, it will be appreciated that a single multi-colored or striped identification filament or multiple

filaments of the same and/or different colors may be incorporated into the core of the wick to make visual identification easier.

FIG. 3 illustrates an alternate first embodiment of a candle wick 10'. In this embodiment, filaments 20, 22, 24, and 26 define a multicolored code. As seen in FIG. 3 the filaments are arranged in a substantially circular pattern. One of the filaments can be colored as a key filament from which the others are to be read in clockwise order. Thus, filaments arranged red, green, blue are a different code from filaments arranged blue, red, green, etc. From the foregoing, those skilled in the art will appreciate that a wide range of codes can be constructed using only a few colors arranged in order. For example, using four filaments and six colors, 1,296 codes can be created ($6^4 = 1,296$).

FIGS. 4 and 5 illustrate a coreless flat wick 110 according to the invention. The wick 110 according to the invention includes a flat braided outer part 112 which is made from cotton threads 114 in a braiding machine. The wick 110 has a central region 116 within which is placed a colored identification filament 120. The colored identification filament is preferably made of a compatible candle wick fiber which is dyed with a colorfast dye which will not fade or change color during combustion or over time. Although FIGS. 4 and 5 show a single monochromatic identification filament, it will be appreciated that a single multi-colored or striped identification filament or multiple filaments of the same and/or different colors may be incorporated

into the central region of the wick to make visual identification easier.

FIG. 6 illustrates an alternate second embodiment of a candle wick 110'. In this embodiment, filaments 120, 122, 124, and 126 define a multicolored code. As seen in FIG. 6 the filaments are arranged in a substantially linear pattern. One of the filaments (e.g. 126 or 122) can be colored as a key filament from which the others are to be read left to right or right to left whatever convention is chosen. Thus, filaments arranged red, green, blue are a different code from filaments arranged blue, red, green, etc.

FIGS. 7 and 8 illustrate a knitted wick 210 according to the invention. The wick 210 according to the invention includes an outer part 212 which is made from cotton threads 214 in a knitting machine. The wick 210 has a central region 216 within which is placed a colored identification filament 220. The colored identification filament is preferably made of a compatible candle wick fiber which is dyed with a colorfast dye which will not fade or change color during combustion or over time. Although FIGS. 7 and 8 show a single monochromatic identification filament, it will be appreciated that a single multi-colored or striped identification filament or multiple filaments of the same and/or different color may be incorporated into the central region of the wick to make visual identification easier.

FIG. 9 illustrates an alternate third embodiment of a candle wick 210'. In this embodiment, filaments 220, 222, 224, and 226 define a multicolored code. As seen in FIG. 9 the filaments are arranged in a pattern. One of the filaments can be colored as a key filament from which the others are to be read according to a predefined convention.

FIGS. 10 and 11 illustrate a square braided wick 310 according to the invention. The wick 310 according to the invention includes an outer part 312 which is made from cotton threads 314 in a braiding machine. The wick 310 has a central region 316 within which is placed a colored identification filament 320. The colored identification filament is preferably made of a compatible candle wick fiber which is dyed with a colorfast dye which will not fade or change color during combustion or over time. Although FIGS. 10 and 11 show a single monochromatic identification filament, it will be appreciated that a single multi-colored or striped identification filament or multiple filaments of the same and/or different color may be incorporated into the central region of the wick to make visual identification easier.

FIG. 12 illustrates an alternate fourth embodiment of a candle wick 310'. In this embodiment, filaments 320, 322, 324, and 326 define a multicolored code. As seen in FIG. 12 the filaments are arranged in a pattern. One of the filaments can be colored as a key filament from which the others are to be read according to a predefined convention.

The above examples illustrate different candles according to the invention and methods of making them. It will be appreciated that another part of the invention is to relate the color coding to candle type and (optionally) manufacturer. FIG. 13 is an example of how this code relationship can be expressed. The table in FIG. 13 illustrates a five order, four color coding scheme. The colors are red (R), green (G), blue (B) and yellow (Y). An ordered combination of five colors indicates the manufacturer, the wick type, the yield (yards per pound), the rate of combustion (ROC in ounces per hour), the flame height and the pool diameter (both in inches).

There have been described and illustrated herein several embodiments of candle wicks and methods for making candle wicks. While particular embodiments of the invention have been described, it is not intended that the invention be limited thereto, as it is intended that the invention be as broad in scope as the art will allow and that the specification be read likewise. For example, the illustrated embodiments refer to specific materials such as cotton threads, and various core materials. It will be appreciated that other suitable candle materials can be used within the scope of the invention. Although four different types of candle wick have been illustrated, it will be understood that the invention can be applied to virtually any type of candle wick. Moreover, while a specific number of colored identification filaments has been disclosed as well as specific colors, it will be understood that the color and number of filaments will be chosen to effect the identification function of the invention. It will also be appreciated that multicolored filaments could also be used, e.g., a blue filament

with a yellow stripe or a green filament with a red stripe. In addition, the placement of the one or more colored filaments can be varied, as desired, for a particular application, the only requirement being that the colored filament(s) not be generally visible along the outer surface or length of the wick, i.e., only the ends of the colored filament(s) being viewable at the tip of the wick, (e.g., see Fig. 1) or when viewed in a cross-sectional cut of the wick, (e.g., see Figs. 2 and 3). It will therefore be appreciated by those skilled in the art that yet other modifications could be made to the provided invention without deviating from its spirit and scope as so claimed.